MYCOTAXON

Volume 110, pp. 379–382 *October–December 2009*

Validation of *Malasseziaceae* and *Ceraceosoraceae* (*Exobasidiomycetes*)

Cvetomir M. Denchev[1*] & Royall T. Moore[2]

cmdenchev@yahoo.co.uk
[1]Institute of Botany, Bulgarian Academy of Sciences
23 Acad. G. Bonchev St., 1113 Sofia, Bulgaria

rt.moore@ulster.ac.uk
[2]University of Ulster
Coleraine, BT51 3AD Northern Ireland, UK

Abstract — Names of two families in the *Exobasidiomycetes, Malasseziaceae* and *Ceraceosoraceae,* are validated.

Key words — *Ceraceosorales, Malasseziales,* taxonomy, ustilaginomycetous fungi

Introduction

Of the eight orders in the class *Exobasidiomycetes* Begerow et al. (Begerow et al. 2007, Vánky 2008a), four include smut fungi (see Vánky 2008a, b for the current meaning of 'smut fungi') while the rest include non-smut fungi (i.e., *Ceraceosorales* Begerow et al., *Exobasidiales* Henn., *Malasseziales* R.T. Moore emend. Begerow et al., *Microstromatales* R. Bauer & Oberw.). For two orders, *Ceraceosorales* and *Malasseziales,* families have not been previously formally described. We validate the names for the two missing families below.

Validation of two family names

Malasseziaceae Denchev & R.T. Moore, **fam. nov.**

Mycobank MB 515089

Fungi Exobasidiomycetum zoophili gemmationi monopolari proliferationi gemmarum percurrenti vel sympodiali, cellulis lipodependentibus vel lipophilis. Paries cellulae multistratosus. Membrana plasmatica evaginationi helicoideae. Teleomorphus ignotus.

Genus typicus: Malassezia Baill., Traité de botanique médicale cryptogamique: 234 (1889).

*Author for correspondence

Zoophilic members of the *Exobasidiomycetes* with a monopolar budding yeast phase showing percurrent or sympodial proliferation of the buds. Yeasts lipid-dependent or lipophilic (excluding the case of *Malassezia pachydermatis*), with a multilayered cell wall and a helicoidal evagination of the plasma membrane. Teleomorph unknown.

The preceding description is based on the characteristics shown in Begerow et al. (2000: 59, as a description of *Malasseziales* R.T. Moore, emend. Begerow et al.). *Malasseziaceae* is a monotypic family. The current placement of the *Malasseziaceae* in the system of the ustilaginomycetous fungi and associated yeasts is based on results obtained from molecular phylogenetic analyses (Begerow et al. 2000, 2007, Fell et al. 2000, Sugita et al. 2002, Sampaio 2004, Weiss et al. 2004, Kumar et al. 2007; see also Hibbet et al. 2007, who did not place the *Malasseziales* in any class but just treated them as '*Ustilaginomycotina incertae sedis*').

The genus *Malassezia* comprises lipid-dependent or lipophilic yeasts (excluding *M. pachydermatis,* which does not need lipid for its growth — Midgley 2000, Gandra et al. 2008, Prado et al. 2008). It includes thirteen species found on the host's skin and in the auricular canals of humans and wild and domestic animals (mainly dogs and cats): *M. caprae* J. Cabañes & Boekhout 2007, *M. dermatis* Sugita et al. 2002, *M. equina* J. Cabañes & Boekhout 2007, *M. furfur* (C.P. Robin) Baill. 1889, *M. globosa* Midgley et al. 1996, *M. japonica* Sugita et al. 2003, *M. nana* Hirai et al. 2004, *M. obtusa* Midgley et al. 1996, *M. pachydermatis* (Weidman) C.W. Dodge 1935, *M. restricta* E. Guého et al. 1996, *M. slooffiae* J. Guillot et al. 1996, *M. sympodialis* R.B. Simmons & E. Guého 1990, and *M. yamatoensis* Sugita et al. 2004 (Marcon & Powell 1992, Guého et al. 1996, Midgley 2000, Sugita et al. 2002, 2003, 2004, Hirai et al. 2004, Coutinho et al. 2006, Morishita & Sei 2006, Cabañes et al. 2007, Gandra et al. 2008, Prado et al. 2008).

Ceraceosoraceae Denchev & R.T. Moore, **fam. nov.**

MycoBank # MB 515091

Fungi Exobasidiomycetum hyphis intracellularibus.

Genus typicus: Ceraceosorus *B.K. Bakshi, in Cunningham et al., Mycologia 68: 649 (1976).*

Members of the *Exobasidiomycetes* having intracellular hyphae — characters given by Begerow et al. (2007: 908) for the *Ceraceosorales* Begerow et al.

Ceraceosoraceae is a monotypic family with a monotypic genus. *Ceraceosorus bombacis* (B.K. Bakshi) B.K. Bakshi 1976 causes a disease of an economically important lumber-producing tree, *Bombax ceiba* L. (*Bombacaceae*), in India (Cunningham et al. 1976).

Acknowledgements

We gratefully acknowledge Drs Scott A. Redhead (National Mycological Herbarium, Agriculture and Agri-Food Canada, Ottawa) and Roger G. Shivas (Queensland Department of Primary Industries and Fisheries, Australia) for critically reading the manuscript and serving as pre-submission reviewers. The financial support from the Bulgarian National Science Fund (grant no. DO 02-181/2008) is gratefully acknowledged.

Literature cited

Begerow D, Bauer R, Boekhout T. 2000. Phylogenetic placements of ustilaginomycetous anamorphs as deduced from nuclear LSU rDNA sequences. Mycological Research 104: 53–60.

Begerow D, Stoll M, Bauer R. 2007. A phylogenetic hypothesis of *Ustilaginomycotina* based on multiple gene analyses and morphological data. Mycologia 98[2006]: 906–916.

Cabañes FJ, Theelen B, Castellá G, Boekhout T. 2007. Two new lipid-dependent *Malassezia* species from domestic animals. FEMS Yeast Research 7: 1064–1076.

Coutinho SD, Fedullo JD, Corrêa SH. 2006. Isolation of *Malassezia* spp. from cerumen of wild felids. Medical Mycology 44: 383–387.

Cunningham JL, Bakshi BK, Lentz PL, Gilliam MS. 1976. Two new genera of leaf-parasitic fungi (*Basidiomycetidae: Brachybasidiaceae*). Mycologia 68: 640–654.

Fell JW, Boekhout T, Fonseca A, Scorzetti G, Statzell-Tallman A. 2000. Biodiversity and systematics of basidiomycetous yeasts as determined by large-subunit rDNA D1/D2 domain sequence analysis. International Journal of Systematic and Evolutionary Microbiology 50: 1351–1371.

Gandra RF, Gambale W, Simão RCG, Ruiz LS, Durigon EL, Camargo LMA, Giudice MC, Sanfilippo LF, Araújo J, Paula CR. 2008. *Malassezia* spp. in acoustic meatus of bats (*Molossus molossus*) of the Amazon Region, Brazil. Mycopathologia 165: 21–26.

Guého E, Midgley G, Guillot J. 1996. The genus *Malassezia* with description of four new species. Antonie van Leeuwenhoek 69: 337–355.

Hibbett DS, Binder M, Bischoff JF, Blackwell M, Cannon PF, Eriksson OE, Huhndorf S, James T, Kirk PM, Lücking R, Thorsten Lumbsch H, Lutzoni F, Matheny PB, McLaughlin DJ, Powell MJ, Redhead S, Schoch CL, Spatafora JW, Stalpers JA, Vilgalys R, Aime MC, Aptroot A, Bauer R, Begerow D, Benny GL, Castlebury LA, Crous PW, Dai Y-C, Gams W, Geiser DM, Griffith GW, Gueidan C, Hawksworth DL, Hestmark G, Hosaka K, Humber RA, Hyde KD, Ironside JE, Kõljalg U, Kurtzman CP, Larsson K-H, Lichtwardt R, Longcore J, Miądlikowska J, Miller A, Moncalvo J-M, Mozley-Standridge S, Oberwinkler F, Parmasto E, Reeb V, Rogers JD, Roux C, Ryvarden L, Sampaio JP, Schüssler A, Sugiyama J, Thorn RG, Tibell L, Untereiner WA, Walker C, Wang Z, Weir A, Weiss M, White MM, Winka K, Yao Y-J, Zhang N 2007. A higher-level phylogenetic classification of the *Fungi*. Mycological Research 111: 509–547.

Hirai A, Kano R, Makimura K, Duarte ER, Hamdan JS, Lachance M-A, Yamaguchi H, Hasegawa A. 2004. *Malassezia nana* sp. nov., a novel lipid-dependent yeast species isolated from animals. International Journal of Systematic and Evolutionary Microbiology 54: 623–627.

Kumar TKA, Celio GJ, Matheny PB, McLaughlin DJ, Hibbett DS, Manimohan P. 2007. Phylogenetic relationships of *Auriculoscypha* based on ultrastructural and molecular studies. Mycological Research 111: 268–274.

Marcon MJ, Powell DA. 1992. Human infections due to *Malassezia* spp. Clinical Microbiology Reviews 5(2): 101–119.

Midgley G. 2000. The lipophilic yeasts: state of the art and prospects. Medical Mycology 38 (Suppl. 1): 9–16.

Moore RT. 1980. Taxonomic proposals for the classification of marine yeasts and other yeast-like fungi including the smuts. Botanica Marina 23: 361–373.

Morishita N, Sei Y. 2006. Microreview of Pityriasis versicolor and *Malassezia* species. Mycopathologia 162: 373–376.

Prado MR, Brito ÉHS, Brilhante RSN, Cordeiro RA, Leite JJG, Sidrim JJC, Rocha MFG. 2008. Subculture on potato dextrose agar as a complement to the broth microdilution assay for *Malassezia pachydermatis.* Journal of Microbiological Methods 75: 341–343.

Sampaio JP. 2004. Diversity, phylogeny and classification of basidiomycetous yeasts. 49–80, in R. Agerer, M. Piepenbring, P. Blanz (eds), Frontiers in basidiomycote mycology. IHW-Verlag, Eching, Germany.

Sugita T, Takashima M, Shinoda T, Suto H, Unno T, Tsuboi R, Ogawa H, Nishikawa A. 2002. New yeast species, *Malassezia dermatis,* isolated from patients with atopic dermatitis. Journal of Clinical Microbiology 40: 1363–1367.

Sugita T, Takashima M, Kodama M, Tsuboi R, Nishikawa A. 2003. Description of a new yeasts species, *Malassezia japonica,* and its detection in patients with atopic dermatitis and healthy subjects. Journal of Clinical Microbiology 41: 4695–4699.

Sugita T, Tajima M, Takashima M, Amaya M, Saito M, Tsuboi R, Nishikawa A. 2004. A new yeast, *Malassezia yamatoensis,* isolated from a patient with seborrheic dermatitis, and its distribuition in patients and healthy subjects. Microbiology and Immunology 48: 579–583.

Vánky K. 2008a. Smut fungi (*Basidiomycota* p.p., *Ascomycota* p.p.) of the world. Novelties, selected examples, trends. Acta Microbiologica et Immunologica Hungarica 55: 91–109.

Vánky K. 2008b. *Restilago capensis* gen. et sp. nov., an ascomycetous smut fungus. Mycologia Balcanica 5: 69–72.

Weiss M, Bauer R, Begerow D. 2004. Spotlights on heterobasidiomycetes. 7–48, in R. Agerer, M. Piepenbring, P. Blanz (eds), Frontiers in basidiomycote mycology. IHW-Verlag, Eching, Germany.